UNESCO JOINT STUDY N. 11

NEW TECHNOLOGIES IN EDUCATION

INFORMATION AND COMMUNICATIONS TECHNOLOGIES AND THEIR IMPACT ON EDUCATION

An overview of the situation in Spain

IGNACIO ITURRINO
Spanish Coordinator

Klagenfurt - Austria
June 12-16, 1984

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CURRENT USE OF AUDIOVISUAL MEDIA IN THE SPANISH EDUCATIONAL SYSTEM.

We can still recall the communicative style of a traditional lecture class. From a high platform a teacher speaks for the space of an hour, seated behind a table. A classroom-full of listeners/students sit bored out of their minds at their desks or take notes in a binder that later, at home, they will have to decipher as if were a medieval manuscript.

This was called "teaching class" or "being in class" by the teacher or the student. From the informative and educational point of view, the effectiveness of the teaching method and the degree of communication that was established were not overly important.

Fortunately, things have changed quite a bit. From the introduction of the blackboard to modern electronic technologies, there is an ongoing effort to improve teaching and make communication more fluid.

Today, use of audiovisual media in spanish schools is quite widespread. A great number of teachers have made the effort to include the audiovisual element in their classes. In the beginning, this element was used as a simple technological aid. It is logical that an art teacher would prefer to show a slide of the Cathedral of Burgos, instead of settling for explaining the ink drawing in the textbook. The next step was the publication of slide collections to "illustrate" such subjects as Art, Geography and Natural Sciencies. The idea was to make learning easier.

Little by little, educators became more aware of the current cultural situation. The new generations have grown up in an "iconic" world, and they have received a large part of their cultural heritage through images. Audiovisual language began to be approached from a linguistic point of view. It is no

longer a simple teaching aid, but rather a true communication medium, with all that this implies.

Sociologically speaking, there are three stages in the integration process of a new medium. The first is fascination. The image that glows in the darkness of a classroom has a strong attraction for the teacher as well as for the student.

However, excessive or indiscriminate use can bring on the second stage, saturation. Audiovisual media come into style, the market is flooded with mediocre productions, and educators overwhelm the student, showing him images that have the effect of a drug: he is absolutely fascinated, but is it doing him any good? Is he learning anything? There is a third stage that should be one of maturity, when educators really know how to use the media; they are well acquainted with their usefulness and methodology, value their effectiveness, and integrate them into the educational system as a valuable element, but not as an end in themselves.

In the case of Spain, we believe that there are a great number of teachers already in this stage, even though it is on an individual level. It is surprising how well audiovisual media have been developed in the field of human, social and religious education, much more so than in other educational areas. It is the total education of man and his communicative possibilities which are the primary objective of the most recent audiovisual productions. This deeper interest in man and in culture has come from teachers of social and religious subjects, and, as a result, publishers specializing in these fields have stepped up production.

We must also emphasize the fact that private companies were and are responsible for the publication, circulation and use of audiovisual materials, as was the case in the field of advertising.

This explains the present dispersion and lack of planning. It is true that the ICEs (Educational Science Institutes) have helped with this aspect of teacher training, but efforts have not been coordinated. There are not even any facilities that provide information on what exists.

The report we are presenting to UNESCO's joint study can help to create a common awareness that a great deal is being done, but in a widely scattered fashion, and that it is necessary to better coordinate the work and creativity of individuals, for everyone's benefit.

In the end, there could be a material reason that will force us to coordinate efforts. As technology advances, AV media become more and more expensive, and individuals can lo longer afford them. So it is the institutions, public as well as private, that will have to take on the task of investing in equipment and materials and encouraging their use, to provide teachers with the media that are seential now, today.

There is still a long way to go as far as teacher training is concerned, so that AV technology can be correctly incorporated into educational system. There are private and some state centers which offer courses; we believe they are absolutely essential if the stage of maturity we mentioned earlier is to be reached.

SOFTWARE

In the first part of the Report, existing software is discussed. Audiovisual media used in education are quite varied as far as technique, use, theoretical basis, subjects and even ages to be used with. First of all, there are 16-mm. and Super-8 films.

Subject matter is basically the field of social sciences and human education. They are produced by state organisms and by private publishers in the education field. There are also some organizations in the Roman Catholic Church and some multinationals, such as McGraw-Hill or Kodak. Finally, we would like to mention the important work done by the embassies, which offer really excellent documentaries free of charge.

With regard to slides, mention is made of the Ministry of Education's collections and the enormous quantity of uninspected material in back-up collections in all fields at all levels.

Audiovisual presentations have been highly developed in the religious field. Several publishers have cultivated this communication medium with great success and effectiveness.

In the field of sound recordings there is abundant material for teaching language and literature, and foreign languages. Unlike Latin America, in Spain the educational effectiveness of radiograms has yet to be discovered.

Finally, there is a widely varied field of publications in the form of wall charts, posters, transparencies, diakinas ("moving" still images) and other less-important media that are more appropriate in the context of a "workshop" or active teaching methods, and that serve as aids involving student participation.

There is a second chapter dedicated to Sujects and Application. The field with the greatest number of publications is that of human and social education, which includes the subjects of communication and family/community relations, social and political structures, human problems, and personal relationships and sex education. Also of great importance is the catalogue of religious training publications, which take a free and personal approach to vital issues rather than offer mere conceptual and impersonal

information. The section made up of Art, Physical, Social and Economic Geography, History, Natural Sciences, Physics and Chemistry, Mathematics, Technology and Skills, Language and Literature, Foreign Languages (English, French, German, Russian and Spanish), and Preschool, constitutes a respectable quantity of material, although it is indiscriminating in its abundance. In most cases the pedagogical aspects are not taken into account.

The third chapter is quite original and suggestive, since it describes Experiments Carried Out with Audiovisual Media. As we have already said, the applications of these media to the educational process are many and varied. In the beginning they had an Educative Technology orientation. Currently, they are based more on the idea of educational participation.

The first experiment described took place in a rural community in the province of Cuenca, Las Pedroñeras, where a Resource Center, provided for by Primary Education Inspection, was set up in a public school. The most important thing to take note of is that it was not a lifeless "media library", but rather an educational project with several stages, and with the objective of getting the students themselves to prepare the necessary educational material.

Another original experience is educational film-making. The student, together with his teacher, is the protagonist of the creation, expression and reading of the images. Students and teachers form work groups, with corresponding distribution of tasks, methodology, and theoretical and technical specialization. The groups work throughout the year, and finish by producing a short in Super-8 or video. This experiment, described in the book "Cinema in the Classroom", has been repeated at the ICEs in Santander and Deusto, Bilbao, since 1.979.

The report also describes the work done by a philisophy teacher in Santa cruz de Tenerife (Canary Islands). We would like to draw attention to the lack of material produced for this subject. The teacher had to work out his own methodology and all the material, in a process of motivating, descriptive and mixed audiovisuals. The objective of combining disciplines in the educational process is also important, as philosophy is then interrelated with other areas of knowledge.

Finally, there is a description, all too brief, of the three-dimensional system ECCA (Canary Islands Cultural Radio), with headquarters in Las Palmas, and today part of COPE (Spanish Popular Radio Network), broadcast over many radio stations on the iberian Peninsula. The system is based on the use of spoken material (heard on radio or from a recorded cassette), printed diagrams and a guiding teacher who meets with students weekly. ECCA's greatest achievement has been to transform a mass medium of communication into a cohesive educational force, and it has carried adult education to unsuspected limits.

The fourth chapter of the report on AV media in Spain includes a list of Training and Guidance Centers. We emphasize once again the decisive work of the ICEs of many universities, which have served to train a great number of working teachers and raise teaching quality. Aside from the ICEs, it has been private initiative which has created numerous training centers at different levels and for different areas. We would also like to draw attention to the huge number of courses, short courses and workshops that take place during holiday periods, at Christmas and Easter as well as over the summer, when numerous teachers give up their free time to improve their knowledge and skills.

The last two chapters are dedicated to the Bibliography and the Addresses of Centers, Publishers and sales or distribution centers of AV material.

The Bibliography includes only those books most used by Spanish teachers, dealing with not only technological knowledge and media use, but also with the basis and use of AV language in the field of education. In the section dedicated to specialized magazines, we must give special credit to the work of two in particular: Medio Audiovisuales and Diagroup. The first is dedicated more to technology and the second to methodology; they have covered an area served by very few publications.

We believe that this report will be of great help to spanish educators, not so much for the large amount of information that it contains, but rather for the suggestions it presents. It will doubtless encourage many to undertake new projects and will assist in the hoped-for coordination of efforts, which will greatly increase effectiveness.

THE COMPUTER IN SPANISH EDUCATION

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A Bit of History

During the 60's and early 70's, computer science was introduced into Spanish institutions of higher learning. During this time, several centers of computer education were created, especially in science and business administration departments at public and private universities. These centers used the computer for scientific computing, research, business games, etc. In most cases there was no official recognition from Spanish authorities, and no control, evaluation, or long-term planning existed.

In the mid-1970's, after several years of experience, the Spanish Administration included computer science in the curricula of vocational training courses. And official degree programs in computer science were established on the university level, on a par with other five-year degree programs and with the possibility of earning masters and doctorate degrees.

Later on, "escuelas universitarias de informática" (university computer science schools) were created. These schools confer mid-level degrees after three years of study. With this mid-level degree, students may continue their studies of computer science at the university or enter the labor force.

Still in existence to this day, along with the official institutions are private academies and centers which are dedicated to the preparation of computer science professionals and technicians for commerce, industry, service agencies, etc.

Also around this time, the Ministry of Education (along with other ministries) computerized its own administration. All central services such as accounting, personnel records, student evaluations,

diplomas, registration, etc. are handled by computer. In the private educational sector, several private companies began to provide the same services of computerization to many private schools. (Roughly speaking, private schools account for half of primary and secondary education in Spain).

In spite of the fact that during the late 70's there was a general consciousness in educational circles of the importance of computers and information processing systems to the citizens of the near future, use of computers was still limited to groups of experts and those "in the know". In general, the educational system at all levels made very little use of the computer for teaching and reserarch.

There are some exceptions. Some institutions of higher education began to investigate and experiment with the computer as an aid to the educational process. We should point out, among others, programs for the automatic correction of multiple-choice examinations (Chemical Institute of Sarriá in Barcelona and the Medical School of the Complutense University of Madrid), for genetic biology laboratory experiments in Valencia, Barcelona and Madrid, for business games in Business Administration Schools in Deusto, Bilbao,ICADE-Madrid, etc.

Agencies were created for processing of administrative, educative and academic data. Some of these agencies lend their services to numerous schools and process academic grades, invoices and other burocratic information for many thousands of students , especially in private education.

Also in the late 70's CAI (Computer Assisted Instruction) programs were developed, one of the best examples being the program at Alcalá de Henares Technical College. Here, CAI programs of various subjects (modern languages, physics and chemistry) were developed for vocational students.

Nevertheless, the first significant experiment in Spain aimed at introducing computer science into secondary schools took place rather early, at the end of 1.969 at the Computing Center of the Complutense University of Madrid, with the collaboration of several other universities and secondary schools in Madrid, Zaragoza and Barcelona.

Returning to the 1.970's similar experiments were done at CENIDE, (National Center of Research in Educational Sciences),at the Computer Center of the Polytechnic University of Barcelona, at the Institute of Educational Sciences of the Polytechnic University of Madrid, and in several secondary schools. In several of these centers, interesting and innovative programs of computer science education were developed, using, among other equipment, programmable calculators (Instituto Cardenal Herrera Oria in Madrid).

The development of programs of this type (integrating computer use into the educational process) was severely handicapped by several factors. These factors included difficulty of access to the equipment, lack of Spanish-made and -oriented software, high equipment cost, lack of reliable analyses and evaluations on which to base programs, and lack of teacher training programs.

Nevertheless, around this time studies were begun analyzing the problems, advantages, limitations, methodology, and results of computer use. These studies were conducted in some Institutes of Educational Sciences with the collaboration of some secondary schools and a limited number of private foundations.

FUNDESCO held and international symposium on computers in education in March of 1.975, with the participation of foreign and Spanish experts. The discussions were centered on the present and future of the computer in education, Spain's experience, computers as teaching aids and the computer's impact on society through education.

After IFIP's Second International Conference on Computers and Education (Marseilles, September of 1.975), the CITEMA and FUNDESCO foundations held a symposium with several Latin American ans Spanish experts in Madrid on "Education and Computer Science from the Viewpoint of a Shared Language and Culture". The discussions focussed on several aspects of the relationship between education and computers in Spain and Latin America, including computer science subjects in secondary school.

The Microcomputer in Public Secondary Schools

In the last few years, the microcomputer has arrived on the Spanish market too. Last Christmas season more than 50.000 home-computers were sold,according to the figures reported in the press (ABC, May 28, 1.984). Its use is becoming widespread in most professional activities. Although the educational system is slower and more resistant to change than other sectors, a climate more positive to use of the computer is becoming extended among educators, favoring its application to the educational process. It might seem strange that, generally speaking, this positive attitude is shared more by educators on the secondary level than on the university level.

An important factor in this pro-computer attitude has been the activities resulting from seminars, symposiums, workshops, programming contests and prizes, etc. organized and sponsored by various private and public institutions such as foundations. The objective of these activities was to introduce educators to the new technologies. We must not forget the importance of the intense advertising campaigns and training programs carried out by some of the important multinational computer hard and software manufacturers, and the rapid spread of specialized computer and educative technology publications and magazines.

Beginning in 1.981, the microcomputer boom has been changing attitudes in educational circles, and quite a few educational institutions have acquired microcomputers, although generally rather indiscriminately, without a coordinated plan and without supervision or control from educational authorities.

According to official information provided by the Ministry of Education itself, in 1.981 there were 170 High Schools (17%) with a total of 217 microcomputers, and a total of 500 teachers giving instruction in Computer Science. Since then, the situation has evolved rapidly, and today it is calculated that there are approximately four times as many teachers and computers in public education as in 1.981.

In the last two years especially, numerous private primary and secondary schools have joined the movement. In many cases, private schools are better equipped than public schools.

Among the most outstanding experiments we would like to mention the LOGO activities at the Aula school and San Ignacio School in Barcelona; the teaching of Computer Science at Santa María del Mar School in La Coruña and at Herrera Oria Institute in Madrid; the experiences with CAI at Alcalá de Henares Technical College and at the Complutense University of Madrid's Computing Center; the teacher training programs at the Institutes of Educational Sciences and teachers associations; the activities carried out by groups of teachers, such as CERO (Valencia), GREI, RECERCA and EINEA (Barcelona), GENIA (Zaragoza), GEAME (País Vasco) Microaula (Murcia), all of them in CAI, CMI, LOGO, etc.; the development of software and teacher training programs at the Computing Centers of the three Madrid universities, at Barcelona Polytechnic and Santiago Universities, and the Department of Computer Science at San Sebastián and Deusto Universities.

To attempt to bring guidance and order to this rich variety of experiences, several symposiums and meetings of teachers and computer science experts were held. Two of the most important were the seminar held in April 1.981 (Buitrago, Madrid) on the Introduction of Computer Science in the General Education System, and the one held in November 1.982 (Valle de los Caídos, Madrid). These seminars brought together the various groups which had been experimenting separately with the teaching of computer science and its application to the teaching-learning process. Points of view, perspectives, and experiences were exchanged. Educational objectives were defined for the introduction of the computer into schools, methodologies were studied, and plans for a pilot teacher training project were created. These plans were complemented by programs of subsequent follow-up and evaluation.

The Buitrago seminar's final report contains a definition of the objetives, a study of the integration of computer science subjects into all educational levels, methodology proposals and details of hardware equipment and human resources. This report has served as a point of departure for several very important innovative programs and more detailed research by the central administration.

One of the most important results of this seminar has been the launching of the Programa Informático del Proyecto TELEGAL, created by the foundations Barrié de la Maza and FUNDESCO, together with the University of Santiago de Compostela.

The objectives of this project are: teacher training in the form of introductory and advanced courses in the application of information processing to the educational task; research on didactical

consequences and students'reactions to computer science; and the adaptation of methods and programs that research shows to be valuable.

Up to now, 1.100 teachers have taken part in the introductory courses, 310 of these teachers have taken advanced courses, and seven Computer Science Classrooms have been created in the Galicia area where the project is being done.

Regional Plans

Recently the Regional Education Administrations have begun Plans for their geographical areas, among which are the following.

In the Basque Country (País Vasco), an Organization for the Promotion and Restructuring of Industry has been created, whose main objective is to create the bases and provide necessary means for the restructuring of Basque industry. One of the organization's programs has been the IMI Program (Incorporation of Microelectronics in Industry), which puts fifteen resource centers at public disposal. These resource centers are provided with audiovisual material for self-instruction (videos, equipment, personal computers, development kits, etc.), and with specialized staff. Numerous introductory courses in computer science and information processing, as well as in-service training courses, are affered at the centers.

As complements, two parallel actions have been started,consisting of providing educational centers with adequate information processing material and, as an experiment, introducing computer science in secondary education.

The activities of the Organization for the Promotion and Restructuring of Industry are being carried out together with the Introduction of Computer Science in General Education Program backed by the Education Council of the Basque Autonomous Government. Inspired by programs such as the Microelectronics Education Program (MEP) of the United Kingdom, the Basque Strategic Plan of Educational Innovation is attempting to speed up the technological training of teachers at the different levels of the educational system, motivate the experimental activity of interdisciplinary groups, and provide schools with information-processing equipment, according to a staggered program. The objetive is to make retraining of the labor force as short a process as possible and create new professions in an industrial community of long standing.

Catalonia is, without a doubt, the Spanish region where the applications of computer science to different educational levels have been developed in the most orderly and coordinated fashion. In this Autonomous Community, quite a few different experiments are being carried out, in the fiel of CAI as well as the inclusion of Basic Computer Science as a specific subject, without forgetting in service training for teachers in these areas.

The Catalonia Government's Department of Education is encouraging experiments in Computer Science, in collaboration with the ICEs at the three Barcelona universities. About a year ago, the Department asked the Polytechnic University's Computing Center to do a study on CAI, in which experiences in this field will be compiled and educational resources and equipment will be analyzed.

At the Vocational Training level, Basic Computer Science courses have been incorporated into the curriculum for all second cycle students and, apart from this, information processing is now a part of the administration field. This became reality in January

of 1.983, and right now the finishing touches are being put on a center, already in operation, for in-service teacher training, in collaboration with the Polytechnic ICE.

Besides this plan of action, the Catalonian Parliament has passed a law on experimental centers, and, as a result of this law, an experiment on LOGO language use in schools has been started in the 1.983-84 academic year at four public and two private schools.

In Galicia, the TELEGAL Project (referred to earlier) has provided the bases for profound educational reorganization at the primary, secondary and vocational levels. The Department of Education of its Regional Government has published some regulations to give legal support to the experiments that are done, and has provided some rural schools with 84 microcomputers (ABRENTE Project).

The Aragón General Council, together with regional banking institutions and the Ministry of Education provincial delegations and FUNDESCO, have signed an agreement for the development of educational applications of Computer Science. Specific actions of this Program are teacher training, creation of research groups for educational levels, publication of educational information processing magazines and manuals, the development of "travelling" courses for rural areas and the design of teaching units for immediate classroom use.

Apart from these several other experiments and plans are being carried out throughout Spain.

In all special attention is given to teacher training, as this is considered the most important factor in changing and modernising educational methods. Along these lines of thinking a permanent national seminar LOGO was created in 1.985 for teachers at Escuelas Universitarias de Formación del Profesorado (Teachers Colleges or Normal Schools). The first workshop held by this Seminar was led by Prof. Horacio Reggini, disciple of

Seymour Papert and responsible for the spanish version of Papert's works.

The experiments, to a certain point unplanned, and the regional programs already mentioned are extremely rich in curricular approaches, varied with regard to media, resources and methodology. Their analysis and comparative evaluation are therefore quite difficult.

Nevertheless, it is possible to select some characteristic elements that can help give us an overview of the current situation in Spain.

In the experiments carried out, computer science education has generally been formed and fashioned within the framework of the EATP (Technical Teaching Activities). On one hand, this has been due to a legal condition, since it was the most appropriate framework so that Computer Science could be approved in the current plan of study and have academic value for the student. On the other hand, including it in the area of the EATPs corresponded with the teachers concept of it, as a clearly interdisciplinary subject and one that supports all the rest. In spite of this fairly widespread placement within the EATP framework, and therefore included in the second and third-year secondary school curricula, numerous teachers have treated Computer Science (because of lack of either funding, legal support or adequate planning) as an extra-curricular activity for secondary and pre-university students, and even teachers from other disciplines with an interest in the subject were encouraged to attend. Thanks to these activities, in a number of schools, the groups of Computer Science teachers have increased, winning support from among the other teachers at the same school. Also, some experiments have been set up within the program as sets of back-up activities for the methodology and teaching of certain subjects over the course of the school year. There are support experiments of this type for Economic Geography, Mathematics, Physics, Chemistry, Literature, and Biology; up to now the greatest number of experiments have been set up in the area of Mathematics and Physics.

In almost all cases, the teachers'underlying concern is to use and develop an innovative and varied methodology with special characteristics, such as:

- The use of processes of interaction, simulations and mathematical model constructions for problem solving
- Operation of approximations and error manipulation
- Development of graphic construction procedures with known and predetermined approximations.
- Development of creativity.
- Development of capacity of transference to other areas which are far removed methodologically and conceptually from the field of Computer Science

By analyzing the experiences described, we can come up with a wide range of objectives for this discipline, derived from the concept that different teachers have of the role of Computer Science and its potencialities in the field of education.

While for some, Computer Science means learning a programming language, the use of equipment, and how to program as well as possible, for others Computer Science consists of the introduction to the knowledge and skills that make up computer literacy, and awareness of the cultural change brought about by the computerization of society; there are also those whose goal is computer assisted instruction.

The objectives and contents revolve around the following subject blocks:

Nucleus A: Contains history and use of information processing machines.

Nucleus B: Studies everything related to information organization, filing and transferance

Nucleus C: Takes in the classic field of languages and programming.

Nucleus D: Concerned with computers' physical, electronic and logical bases

Nucleus E: Compiles applications of information processing to widely diverse fields, including games

Nucleus F: Includes topics related to the interaction between man adn machine in its social, ethical and economic aspects

Nucleus G: Includes tipics related to the development of human capacities and instrumental skills

During 1.983 the Central Ministry of Education, which in the two preceding years had become aware of the growing importance of the movement throughout the country, decides to take charge of, order and coordinate the experiments carried out by teachers, schools and regional governments.

There are two basic parts to this: educational planning and academic programming. The Ministry is using two tools: the ATENEA Project and the Reform of Middle Education.

* USA

The purpose of the ATENEA Group, made up mainly of representatives of the Ministries of Education and Industry, consists of designing a General Plan. The general outline of this plan is:

- Teacher training on the subject of Computer Science.

- Desing of equipment most appropiate for schools. The participation of domestic industry in providing equipment is a prime objetive.

- Providing specific software to use with physical equipment. The transportabiliy of this software, its suitability for the Spanish situation, etc. will be studied. Special efforts will be made to anclude teachers and educators in the planning and construction process.

- Definition of the nature of Computer Science instruction to be used.

- Determination of why, what for, how, when and by whom Computer Science is used, and its inclusion in nom-university institution curricula.

One of the more novel aspects of the Reform of Middle Education currently in the experimental phase, is the teaching of Computer Science to students between 14 and 16 years of age. This school year, the Ministry has begun a pilot project in 31 specially selected secondary schools. These schools are being equipped with microcomputers and teaching staff already trained to use the computer in their own fields, as well as to introduce their students to Computer Science.

In line with this project, Computer Science will be included in the optional area of "Technological Studies".The objective of this area of study is to introduce the student to the process of technological education, including basic technical skills used in the world today and their importance in the business world.

The objectives of this test project run by the Ministry are to:

- Aid students in understanding the social, cultural and economic importance of information processing.

- Introduce students to the specific techniques of information processing.

- Develop students' logical and analytic capabilities.

- Teach students to program in a heigh-level computer language.

- Develop students' creativity.

- Make students aware of the professional opportunities that exist with information processing.

The Ministry recommends that each center design its own program. The project will be more illuminating if there is a variety of programs within a general framework.

Other New Technologies

Apart from computers, other modern technologies are being tried out in schools. Among others, we would like to point out video, videotex and cable radio (hilo musical).

Use of the Video is rapidly becoming generalized in Spain, especially for entertainment in the middle and upper classes. At present we have reliable date on what is happening with video in education, but as far as the video-disc is concerned, including the interactive video-disc, it is not being used to our knowledge.

The Videotex in education has been studied for some time. In its first experimental phase, more than 5.000 pages of educational material were written by FUNDESCO. Since the videotex was put on the market in 1.982, several Spanish universities (*) have entered into contracts with the Spanish National Telephone Company (in charge of the system) as suppliers of educational and cultural information. Research projects are being set up to study the possibilities of this medium in education.

The study of the advantages and shortcomings of Cable Radio as a medium of education has been the object of a research program recently finished. Language teaching, introduction to music and social area subjects are among the areas studied.

CONCLUSIONS

Some other experiments and projects have doubtless been omitted from this overview of the Spanish situation. However, in all fairness we must say that most of them are merely first steps, and that the applications of computers and other new technologies in the teaching-learning process are still far from "permeating" the Spanish educational system.

Nevertheless, although the new technological movement in education has started later than in other countries, it has considerable strength. We have ample reason to believe that the new information and communication technologies will very soon play an important role in the Spanish educational system.

(*) Madrid-Polychnic, Valencia and Zaragoza.

CURRENT USE OF VIDEO TECHNOLOGY IN THE SPANISH EDUCATIONAL SYSTEM.

The invasion of Video into Spanish society has been controlled, as in other contries, by two elements: technology and the market. Electronics has really taken off in the past few years, so much so that there is a kind of psychological conviction that "electronics can do anything". What was impossible a few months ago is reality today. What is still a dream for the user is already being worked out in the feverish brains of slant-eyed engineers, and what took up the space of a cigarette packet yesterday can now fit on the head of a pin. As a top executive at a multinational said, "If I wanted to buy myself the best and most complete set of equipment, I would never be able to decide because the latest model is always on its way." All of this means, among other things, that the electronic market is varied, appetizing, and adapted to all tastes and needs, and the uninitiated would-be user gest totally confused.

This brings us to the second devastating element in the video fiel: the market. There is an overwhelming flood of models, payment plans, and advertising. The manusfacturers have put that first "fascinating" moment that has made television a shrine in every home to good advantage. And video, television "a la carte", has more than satisfied everyone's fondest dreams. Great economic interests are involved in this market which controls and manipulates man's appetites. There are other residual impacts-ethical, cultural and educational-whose importance has not yet been determined.

So what can be said about educational video in Spain? It is like discovering a sand dune: a lot of grains of sand, no structure whatsoever, and mass movement according to which way the wind blows. How can we sum up experiences? With great difficulty; rather, we will have to give a list of already-prepared programs that Spanish educators can use. It is still too early to talk about the integration of this technology into the teaching process. Because "video" does not mean having a television and a VCR, and

renting films. Many people are still arguing about the relative merits of the three home systems-VHS, Beta and V-2.000- and the more portable one-piece models. Others, who have made up their minds, look around blindly for software-films-that they often record from commercial television, file in an everlarger video library, and then have no idea how to make use of.

The truth is that video is not so simple. Using video didactically and educationally is taking a giant step forward in audio visual communication. Some suppose that in the educatinal system, audiovisual training and communication for teachers and student can just be picked up through experience. This is not completely true. We have not yet been taught to read and write moving images. We move among the images like illiterates who have just learned to spell but are not yet acquainted with the subtleties of syntax or semantics.

This does not prevent the Spanish market from offering numerous high-quality productions. But we already see the signs of that second stage, saturation, when we can't see the forest for the tress. We would like to warn the Spanish educator against investing in video equipment without first providing for the training that will be necessary. It is not advisable to start out directly with video without first having tried and assimilated other "lighter" technologies, which should be used as long as they are valuable. And they really are valuable; it is not true that the new media replace the old. Television, for example, has not replaced radio, but rather has made it stronger and more directed. Video should not push overhead projectors and slides into the background. But we do have to look for its particular language and get the most we can from it.

We have seen that many companies produce and use video as part of personnel training. A policy of ongoing contact with these companies would result in ecellent productions to be used in a variety

of educational situations. All of us are still in the learning phase with this new medium, and there is a long way to go. A healthy spirit of constructive criticism is needed, or we will fall into the claws of technology and the market, which may take us where we do not want to go.

In the report we have focussed on the educational aspects of video, and have left aside the complex field of video as art. Today this field is more a project carried out in electronic laboratories, where creative minds do their experimenting and are enraptured by their discoveries. Let's not let ourselves be fascinated too soon by these experiments, more a product of microchips than aesthetics.

We have also left out the area of videogames, although we realize that aspects of these games are valid for the development of skills, reflexes, and hand-eye coordination. They also present an interesting oportunity in the area of simulations. In the future, we will have to watch this extrascholastic training which comes from the new technologies (television, video, telephone and computers). School and family, the two traditional educational environments, have been completely overwhelmed by this new telematic society that surrounds us. And children are born into it, as into their natural environment.

Limiting ourselves to the Spanish scene and strictly within the field of educational video, there are three outstanding points brought out in the report: Didascalia, Catalonia and Ancora.

Didascalia is the only private company which has branched out into the production of educational video films adapted to EGB and BUP programs. First, a studio with semiprofessional equipment was set up, and their teachers did a training course.

With their own technology and staff, and importing the more involved sequences from abroad, for several years they have been preparing their own productions, which are now on the market.

The contents focus on the most important and difficul aspects of each subject. A teacher's guide and a student work/activity plan is included with each tape. We must mention that these particular productions are the result of a long process of investigation and classroom experimentation, and were produced in collaboration with other American and European production centers.

We have seen that Catalonia is the only place that has taken the use of educational video seriously on the official level. There are already several organisms where educational videos can be found, as well as a plan laid out by the Generalitat for the integration of video into the teaching process.

The Services of Popular Culture has in-house and foreign-produced videos, which contain brief educational units to be used as lessons. The Service of Community Video, sponsored by the Barcelona City Government and the Caixa (Catalonian Saving Bank), offers equipment, training courses, consulting services and resource centers.

The Generalitat Department of Education worked out a plan in four stages: training courses, providing 80 public schools with equipment, creation of educational material, and compilation of existing material. Currently, besides a valuable catalogue of productions, they have 24 Resource Centers to assist teachers.

In Catalonia there is also a private center, the Súnion School, which has put a great deal of effort into the integration of audiovisuals into the teaching process. They have set up their own semiprofessional studio as a laboratory for their teachers and students.

Among the examples worth emphasizing in Spain, the report mentions Ancora Productions, the publisher famous for its audiovisual productions, which has entered whole-heartedly into the video field. They began with their collections of slides and 16-mm. and Super-8 films, and also distribute the fantastic Encyclipedia Britannica collection (now partially available on video). Today Ancora is the exclusive agent for the Open University, the splendid BBC production.

There is a long chapter in the report dedicated to the compilation of existing materials. It is divided according to subject, and in each section there are descriptions od video productions that can be used in educational contexts. It is all in alphabetical order. Besides the more common sections, such as Art, Sciences (quite abundant), Languages, Films, Comics, Geography, Religion, History, etc., there are some more novel sections we would like to mention. There is an image bank with hard-to-get sequences which may be acquired and incorporated into in-house productions. There are also some videos on sports and physical training, in which computer digital image has been used. Also of importance is the section on Business Administration, which shows private companies' interest in the use of the new technologies. There is a new informative genre springing up: the "videomagazine". Scenes illustrating the most important news events are periodically compiled on videocassettes. This communication form is quite effective, especially for news reporting. Finally, we must not forget that public television (TVE) is an

inexhaustible source of educational and cultural programs. Copies of most programs broadcast can be obtained from the Files and Documentation Department. There are successes such as "Man and Earth", "Ramón y Cajal", "Saint Teresa".

The next three chapters of the report list the addresses for producers and distributors, lending centers and training centers. Although in Spain the number of video clubs has multiplied rapidly (they are estimated at 5.000, many of them in working- class neighborhoods), in the field of education it is necessary to seek out specialized centers. There are quite a few for sales, less for lending and still less for training. Nevertheless, we believe this last chapter is of great importance. It is absolutely essential that educators be trained before schools acquire materials. There are too many educational institutions that have been equipped with both hard and software, only to find that almost no one uses them due to lack of information on use or usefulness.

Going on now with our look at the report, it is good to know that there are recording studios of varying quality, where it is possible to make relatively inexpensive video recordings. Remember that a number of photographers of weddings and other social events have turned to video, and offer "domestic" products, in quality as well as in price.

In the last part of the report, there is a list of the publications in Spain on the subject of video, books as well as magazines. It is a rather changeable and uneven filed. Due to the commercial boom, sensationalist titles appear that are generally quite short-lived. In many cases they are more concerned with commercial than with educational aspects. There are, nonetheless, some ten magazines and twenty books that may be of interest to educators.

We are all convinced that the new video technology has given educators a first-class teaching tool. But we are still in prehistoric times. Technological advances and the demands of the market change the situation every six months. In the field of education we have only just begun. There is a lot left to learn, and it is up to the younger educators to investigate and advance along this path, full of resources that must yet be invented.